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Chulabhorn Research Institute

INTERNATIONAL CENTRE FOR ENVIRONMENTAL AND INDUSTRIAL TOXICOLOGY (ICEIT)

CRI's ICEIT has been designated as a
"UNEP Centre of Excellence for Environmental and Industrial Toxicology".

CRI Hosts Second Meeting of the Network for Scientific Cooperation in Biotechnology, 30-31 August 2001

This meeting, which was organized by CRI under the capacity building program supported by the United Nations Development Program (UNDP), was attended by delegates from nine countries. The two-day meeting opened with a mini symposium on "Biotechnology: from Research and Development to Commercial Products". Two keynote papers were presented at the symposium by Professor A.M. Chakrabarty of the Department of Microbiology and Immunology at the University of Illinois at Chicago on "Biotechnology Commercialization in Developing Countries: Regulatory Needs and Beyond"; and by Professor Sir John Beringer, Pro-Vice Chancellor of the University of Bristol on: "Developing GM Products in the European Union".

The mini symposium was followed by presentations on the status of biotechnology, current strengths and weaknesses and results so far achieved in countries in the Asia Pacific region.

Discussions following the presentations by delegates from the region recognized the need to balance the desire to use GM technology with acceptance of the fact that traditional breeding and selection methods may solve problems in the short term. There was an awareness of the importance of clear communication between research scientists in the area of GM technology and politicians, NGOs and the general public.

The meeting also agreed about the importance of educating scientists on the need for a return on investment made in their research.

On the second day of the meeting there were discussions on regional resources and strategies for cooperation.

Environmental factors in autism

Autism refers to a group of developmental disorders that includes autistic disorder, atypical autism, and Asperger syndrome. Children with these disorders display deficits in social interaction and communication.

While exposure to certain environmental chemicals is thought to cause neurodevelopmental disorders, the origins of most of these are unknown. Today, many researchers are focusing on the possibility that at least some of the brain disorders affecting children are produced when environmental conditions interact with genes in susceptible individuals.

In the United States, the National Institute of Environmental Health Services (NIEHS) is supporting several research efforts to investigate the role that environmental factors may have in causing autism in children. An autism coordinating committee has now been set up charged with enhancing the quality, pace and coordination of efforts to prevent and find a cure for autism.

The NIEHS has welcomed input from autism advocacy and parent organizations. Parent representatives meet once per year with the committee to discuss upcoming NIH autism initiatives, to highlight important findings in autism, and to seek parents' input into the research agenda. This yearly conference is sponsored by all member institutes on the committee, including the National Institute of Mental Health, the National Institute of Neurological Disorders and Stroke, the National Institute on Deafness and other Communication Disorders, and the National Institute of Child Health and Human Development. The NIEHS and the National Institute of Child Health and Human Development have already taken the lead as primary sponsors of a meeting focusing on cellular and molecular mechanisms in autism and related neurodevelopmental disorders.

Source: Environmental Health Perspectives, Vol. 109, No. 6, June 2001.

Commercial production of diatoms

Diatoms are single-celled aquatic plants used in a number of commercially important applications. They are added to infant food formulae since they produce fatty acids similar to those produced in human breast milk. Some diatoms also produce beta-carotene, which is used in animal feed, as well as a pigment used to label compounds in scientific experiments, and nutrients important in shrimp and fish cultivation. Until now, diatoms have been reared in large outdoor pools since they are sunlight-dependent. Now, however, scientists have freed diatoms from this dependence on sunlight by using a gene from human red blood cells. This remarkable development not only enables diatoms to grow in the dark, but with unprecedented speed and efficiency.

The gene transferred into the diatoms' genetic structure allows them to absorb glucose, and once they have absorbed the glucose, they can break it down for energy.

This means the diatoms can now be grown in hundred gallon glass vessels which are not exposed to contamination, as was the case when they were reared in outdoor pools. Moreover, the glass vessels allow for the control of factors such as temperature and nutrient mix, providing a cleaner, more efficient and inexpensive commercial supply of these microalgae.

Source: Chemistry & Industry, No. 13, July 2001.

THE RADIATION HAZARDS OF CELLULAR PHONES

Despite the number of research projects undertaken in recent years on the health risk of cellular phones, the question of whether or not they pose a danger remains unanswered.

Many radiation experts maintain that it is physically impossible for cellular phones to have any biological effects. Cell-phone emissions range in frequency from about 800 to 2,000 megahertz. The average power transmitted by a typical mobile phone is about a quarter of a watt. If the phone's antenna is placed next to someone's head for a few minutes, the waves will raise the temperature of the nearby brain cells by a maximum of about 0.1 degrees Celsius.

Because this heating is about one tenth the normal fluctuations of the brain's temperature, it is unlikely to affect the organ. What is more, cell-phone radiation is non-ionizing, unlike the high-energy photons in x-rays and gamma rays, which can shatter DNA molecules and thereby trigger cancer-causing mutations. Radio and microwave photons are not energetic enough to break the chemical bonds of organic molecules.

Several experiments, however, suggest that low-power radio and microwaves can affect the mental performance of people and animals. In a study carried out at the University of Bristol in the U.K., a group of volunteers were asked to perform an array of cognitive tasks while they were exposed to simulated cell-phone emission from headsets. The emissions had no apparent effect on short- or long-term memory, but the exposure significantly decreased the subjects' reaction times as they pressed buttons to match the words "yes" and "no" flashed on a computer screen. In other words, the radiation made the volunteers quicker on the draw. Finnish scientists conducted a similar test and also found decreased reaction times. But when rats were exposed to low-power microwaves the animals took longer to find their way through a maze than the rats in the control group.

In May 2000, a panel of experts commissioned by the British government released a report recommending that children be discouraged from using mobile phones for non-essential calls. The recommendation is partly based on evidence that a cell phone's electromagnetic field penetrates more deeply into a child's head than an adult's, so any possible health effects are likely to be more pronounced in children. The panel also recommended that wireless companies stop promoting the use of mobile phones by children.

Source: Scientific American, Vol. 283, No. 3, September 2000.

ENVIRONMENTAL AND GENETIC FACTORS CONTRIBUTING TO LEVELS OF CADMIUM AND LEAD IN BLOOD

The assessment of human exposure to cadmium (Cd) and lead (Pb) is usually based on biomarkers, in particular concentrations in blood and urine, and levels detected are believed to reflect mainly ongoing environmental exposure.

However, there is often considerable variation between individuals, indicating that factors other than exposure might be of importance.

A study carried out at the Institute of Environmental Medicine, Karolinska Institute in Sweden set out to evaluate to what extent variation in blood concentrations of Cd and Pb (BCd and BPb, respectively) are genetically influenced. This research project aimed to discover the relative importance of genetic and environmental effects for BCd and BPb, the degree to which sex differences influence these effects, and also the extent to which the same genetic and environmental influences are of importance for BCd and BPb.

The study group consisted of twins participating in the Swedish Adoption/Twin Study of Aging (SATSA), a longitudinal research project based on a sub-sample of same-sex twins from the Swedish Twin Registry. The SATSA cohort consists of twins 50 years of age and older and who were either reared apart or together. Participants in SATSA responded to questionnaires and participated in in-person testing at regular 3-year intervals.

Although this is the first known report of genetic influences on blood metal concentrations in a large number of individuals, the number of pairs for the analyses was small by twin study standards. The classical twin study has much greater power to identify significant genetic rather than shared environmental effects. Comparisons across age groups were limited by power considerations. Perhaps the greatest limitation is the absence of unlike-sexed pairs. Their inclusion is essential to draw conclusions concerning whether or not the differences in heritability estimates reflect different genes operating in men and women or other forms of sex limitation.

The study found that the variation in BCd and BPd concentrations between individuals is not entirely attributable to environmental exposure.

Genetic influences on blood concentrations of Cd and Pb were most pronounced in non-smoking women. Thus blood metal concentrations are influenced by different factors in men and women and are not the direct indicators of exposure as previously believed. This new knowledge will improve the evaluation of exposure and internal dose-important parts in the risk assessment process.

The researchers conclude that it is important to study the effect in a younger population than that of the present study in order to identify risk groups in the population.

Source: Environmental Health Perspectives, Vol. 108, No. 8, August 2000.

Influence of lead on blood pressure and hypertension

Lead absorption is known to increase blood pressure, especially systolic blood pressure, at blood lead levels as low as 5µg/dL. However, little is known about genetic variation in risk of elevated blood pressure from lead.

In particular, two polymorphic genes known to modify the toxicokinetics of lead—those for the vitamin D receptor (VDR) and δ-aminolevulinic acid dehydratase (ALAD) – could influence the effect of lead on blood pressure and hypertension.

ALAD is a principal erythrocytic binding site for lead, and such binding differs for the three isoforms of the ALAD protein. Thus, the polymorphism could influence the effect of lead on blood pressure by, for example, modifying the deposition of lead at the critical cellular or molecular targets through which lead acts to cause elevations in blood pressure. VDR genotype is also of particular interest not only because it has been implicated to modify the absorption of lead and the uptake and release of lead from bone, but also because alterations in calcium metabolism have been implicated in the risk of elevations in blood pressure and essential hypertension.

A recent research study reports the relations between ALAD and VDR genotypes, three lead dose measures, and blood pressure and hypertension status in lead workers in Korea. The population of the study was 798 Korean lead workers and 135 controls without occupational exposure to lead.

Lead dose was assessed by blood lead, tibia lead measured by X-ray fluorescence, and dimercaptosuccinic acid (DMSA)-chelatable lead. Among lead workers, 9.9% *(n=79)* were heterozygous for the

(Continued on page 6)

REMOVAL OF BENZENE FROM CONTAMINATED SOILS

Benzene presents a significant environmental problem. It is used in various manufacturing processes and is a main component of petroleum based fuels. Benzene is soluble, mobile, toxic and stable. It is poorly biodegraded in the absence of oxygen, and although anaerobic benzene biodegradation has been documented under various conditions, until now there were no organisms in pure culture that degraded benzene anaerobically. However, recent research has identified two *Dechloromonas* strains, RCB and JJ, that can completely mineralize various mono-aromatic compounds including benzene to CO_2 in the absence of O_2 with nitrate as the electron acceptor.

In the research carried out at Southern Illinois University, *Dechloromonas* strains RCB and JJ were enriched and isolated from two diverse environments on the basis of very different metabolic abilities namely microbial (per)chlorate reduction and microbial humic-substances oxidation.

Previous studies carried out by the same research group have demonstrated the ubiquity of the *Dechloromonas* species, and members of this genus have been identified in a broad range of environments including pristine and contaminated soils and sediments, and even in soil samples collected from Antarctica.

The results of the current research indicate that the members of the genus offer great potential both for the attenuation of perchlorate and also for the treatment of benzene in contaminated environments.

Source: Nature, Vol. 411, No. 6841, June 2001.

POST WAR EFFECTS OF AGENT ORANGE

A meeting was convened in Singapore during the week 27 November to 1 December 2000 with the goal of exploring the possibility of launching a joint US-Vietnam research program to study the human and environmental health effects resulting from spraying Agent Orange and other herbicides during the Vietnam war.

The meeting followed an earlier public symposium held in August 2000 in California, in which a panel of invited experts and an open audience considered the scientific concerns that should be addressed in the study of the effects of Agent Orange exposure in Vietnam. Agent Orange is a blanket term for the various formulations of herbicide used between 1962 and 1971 to remove forest cover and to destroy crops in Viet Cong occupied areas of Vietnam and Laos.

Most of the various formulations used were mixtures of the phenoxy herbicides 2,4-D and 2,4,5-T.

These herbicides were contaminated with minute amounts of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, also known as dioxin), a by-product of the manufacturing process for 2,4,5-T. TCDD has a half-life of 8.7 years in humans. It is a persistent organic pollutant; after 25 years since the end of the Vietnam War, a quarter of the TCDD released through herbicide spraying is still in the Vietnamese environment. TCDD has been found to be biologically active at minuscule concentrations.

TCDD has been shown to suppress the immune system in animals, and has caused cleft palate and ureter defects in mice. Rats exposed to TCDD have shown hormonal imbalances, which may affect the development and function of the endocrine system. TCDD is also believed to cause cancers such as Hodgkin disease and soft-tissure sarcoma, liver damage, reproductive problems such as spina bifida and miscarriage, neurotoxicity, and skin effects such as chloracne, which causes severe acne-like lesions. In January 2001, the National Toxicology Program published an addendum to the Report on Carcinogens, Ninth Edition, listing TCDD as known human carcinogen.

At the Singapore meeting, both sides agreed on the need to identify areas of concentrated contamination throughout Vietnam. Further discussion centred on emerging remediation technologies and how they can be shared between the countries.

For instance, faster, cheaper methods for analyzing dioxin residues in environmental samples, such as immunofluorescence and gene expression assays, could accelerate the process of identifying highly contaminated areas and monitoring migration of dioxin through the environment.

Both human effects and remediation research will benefit from capacity building in Vietnam. Labs, equipment, systems, and training are all needed, but available resources may go a long way toward meeting some of these needs. For instance, Vietnamese scientists could go to the United States to train in the methodologies used there, and the Internet could be explored as a means for long distance training.

A number of key areas have been agreed on: building Vietnamese laboratory capacity for measuring health effects and measuring dioxin in environmental and human samples, provision of quality assurance and performance testing for Vietnamese laboratories, exchange of scientists and training for Vietnamese scientists in skills and technology that can aid in TCDD-related research.

Source: Environmental Health Perspectives, Vol. 109, No. 3, March 2001.

Panel Studies of Air Pollution and Respiratory Symptoms in Bangkok, Thailand

Several studies in cities in North America and Europe have reported associations between air pollution and respiratory symptoms. Replicating these studies in cities with very different weather and population characteristics is seen as a useful way of strengthening inferences of causality. This was the rationale for a recent study which examined the responses of three different panels to particulate matter (PM) air pollution in Bangkok, Thailand.

This city is situated in a relatively flat plain and has a population of over 10 million.

Because of its low proportion of roads to surface area, the city has difficulty supporting the large number of automobiles (approximately 4 million) and motorcycles (close to 2 million, many of them with two-stroke engines) operating on the streets in Bangkok. The inefficiency of the two-stroke engines and the ubiquitous traffic jams result in a large share of PM_{10} in Bangkok coming from incomplete combustion of fossil fuels in transportation.

The Pollution Control Department (PCD) within the Ministry of Science, Technology and Environment was operating four monitoring stations for PM_{10} (beta attenuators) in 1995 when the study began. The population groups for this study were specifically selected because they lived and worked near one of the PM_{10} stationary monitoring locations. These PM_{10} measurements are likely to be better indicators of PM_{10} exposure for these subjects than they might be for subjects who spend time commuting to and working in other locations during the day. Three groups were chosen located near two of the monitors, at Odean Circle and at Chulalongkorn Hospital. The Odean Circle area, known as the Chinatown of Bangkok, is a densely populated residential and commercial area with small streetside shops located on intertwining narrow roads. Business dealings, which may begin as early as 4 am and extend beyond 9 pm, usually take place on the ground floor, and the upper floors are used as residences. As a center for wholesale business, Odean Circle is congested with vehicles for a large part of the day. Therefore, the residents in this area are likely to be exposed to high concentrations of air pollution. The Chulalongkorn site is located near the city center and is surrounded by wide streets often congested throughout the day.

The three groups of subjects recruited were adults who lived and worked in the Odean Circle area, children who lived and attended school in the Odean Circle area, and nurses and student nurses at Chulalongkorn Hospital who lived in nurses' dormitories near the hospital.

All subjects (and parents of the children) consented in writing to participate in the study after being informed about what their participation entailed. The adult subjects started their symptom diaries as they were recruited, from mid-December 1995 to early January 1996. The children started their diaries on January 9, 1996. The adults were asked to participate over a 90-day period, whereas the children, because of school holidays, were involved for 69 days. The selected subjects were also offered a small monetary incentive paid at the completion of the diary period. Three instruments were developed for the diary study: a subject screening questionnaire for adult subjects, a daily symptom diary form for the adult participants and a simplified version for the children, and a background questionnaire for all study participants.

In the Odean Circle area, field staff interviewers visited each adult subject daily and recorded responses to the diary questions. This was necessary to maintain reasonable response rates and compliance for this panel. The nurses completed the diaries on their own, with weekly contacts from selected nurses recruited to help supervise the diary execution and periodic contacts from the study team. Schoolchildren completed the diaries at school with the supervision and assistance of their teachers. All diaries were written in Thai.

The diary was conducted during the high pollution months in Bangkok (December-March) and is not necessarily representative of the effects of PM_{10} during other times of the year or for other populations though there is no reason to expect PM_{10} effects occur only during high pollution months.

Taking the results of the three panels together, there is evidence of an association between upper and lower respiratory symptoms and PM_{10}. Replicating previous studies from the Western industrialized cities in a city such as Bangkok, which has very different meteorologic conditions, baseline health status, and activity patterns, provides strong evidence for causality.

The results of the daily symptom diaries for adults in the Odean Circle area show substantial and robust PM_{10} effects on the incidence of upper and lower respiratory symptoms. One of the selection criteria for this subject group was that they worked in shops not air conditioned in a high-traffic commercial area. This group, therefore, is expected to have fairly high exposures to outdoor air pollution during the day. Positive associations of smaller magnitude were also found between PM_{10} and symptoms for nurses working and living at Chulalongkorn Hospital. The nurses were expected to have lower exposures to outdoor air pollution because they worked primarily in air-conditioned areas of the hospital. Finally, positive associations were also observed in the panel of schoolchildren. Based on the basic model specifications, including daily weather variables, the estimated PM_{10} effect for the schoolchildren was somewhat larger than for the nurses, but smaller than for the Odean Circle adults. The results for schoolchildren were not as robust to variations in the model specifications as those for the adult panels. This may be because the diary was conducted for fewer days with the children and children may not report their symptoms as accurately as adults.

The results reported in this study show statistically significant PM_{10} effects in three different population groups in Bangkok, but these groups had some unique characteristics that make it difficult to generalize to the entire population of Bangkok. Daily symptom diary studies could be extended to other population groups whose exposure circumstances vary. For Bangkok and other cities outside of the industrialized West, further diary work would also be enhanced by obtaining daily information on indoor sources of PM, including exposure to cooking sources. In many countries, these sources represent a significant burden.

Source: Environmental Health Perspectives Vol. 109, Suppl., 3 June 2001.

Influence of lead on blood pressure and hypertension

(Continued from page 3)

ALAD^2 allele, and there were no *ALAD*^{2} homozygotes; 11.2%*(n=89)* had at least one copy of the VDR *B* allele, and 0.5%*(n=4)* had the *BB* genotype. In linear regression models to control for covariates, VDR genotype (*BB* and *Bb* vs. *bb*), blood lead, tibia lead, and DMSA-chelatable lead were all positive predictors of systolic blood pressure. On average, lead workers with the VDR *B* allele, mainly heterozygotes, had systolic blood pressures that were 2.7-3.7 mm Hg higher than did workers with the *bb* genotype. VDR genotype was also associated with diastolic blood pressure; on average, lead workers with the VDR *b* allele had diastolic blood pressures that were 1.9-2.5 mm Hg higher than did lead workers with the VDR *bb* genotype (p=0.04). VDR genotype modified the relation of age with systolic blood pressure; compared to lead workers with the VDR *bb* genotype, workers with the VDR *B* allele had larger elevations in blood pressure with increasing age. Lead workers with the VDR *B* allele also had a higher prevalence of hypertension compared to lead workers with the *bb* genotype [adjusted odds ratio (95% confidence interval) = 2.1 (1.0, 4.4), p=0.05]. None of the lead biomarkers was associated with diastolic blood pressure, and tibia lead was the only lead dose measure that was a significant predictor of hypertension status. In contrast to VDR, ALAD genotype was not associated with the blood pressure measures and did not modify associations of the lead dose measures with any of the blood pressure measures.

The data from the Korean study is believed to be the first in which the common polymorphism in the VDR is associated with blood pressure and hypertension risk.

Source: Environmental Health Perspectives, Vol. 109, No. 4, April 2001.

Preparing for biowarfare

A study carried out by a team of scientists from the London School of Hygiene and Tropical Medicine warns that the European Union is poorly prepared to identify and respond to potentially threatening outbreaks of infectious diseases, making it vulnerable to bioterrorism.

The study looks at the performance of the European Union's disease surveillance network, in which national health institutes detect any cases of infection and then advise other members if the outbreak could have widespread repercussions. A number of major failings are identified including poor communications between national surveillance networks and lack of trained personnel to investigate cross-border infections.

Researchers involved in the study collected data on five past outbreaks of infectious disease selected primarily to capture different routes of disease transmission. Over 50 interviews were undertaken to determine what happened in each instance, what should have happened, what the difference was and what improvements could be made. There was found to be a general failure to link information to action. One case study concerning an outbreak of legionnaires disease in citizens from four EU member states that was linked to a location outside the EU revealed that although information was circulated within public health networks, action to alert the travel industry was delayed and further cases of the disease occurred.

The study recommended that the European Commission should further develop existing disease related surveillance networks within a framework in which organizational, financial, and legal uncertainties are clarified. Untoward events, natural or deliberate, such as those due to terrorism or biowarfare may appear simultaneously in different locations.

Recognition of the nature of the event requires alert clinical services and effective reporting to national surveillance authorities. Most importantly, early recognition that the event is of international concern requires a swift exchange of information between national authorities to ensure that immediate action can be taken.

Source: British Medical Journal, No. 323., October 2001.

CLIMATIC EFFECTS ON DAILY MORTALITY RESULTING FROM AIR POLLUTION

In different weather conditions, constituents and concentrations of pollutants, personal exposure, and biological responses to air pollution may vary. A new study conducted by researchers at The University of Hong Kong has assessed the effects of four air pollutants on human mortality in both cool and warm seasons in Hong Kong. Daily counts of mortality and cardiovascular and respiratory diseases were modeled with daily pollutant concentrations.

During the cool season, for a linear extrapolation of 10^{th}-90^{th} percentiles in the pollutant concentrations of all oxidant pollutants, NO_2, SO_2, and O_3, it was found that there were significant effects on all the mortality outcomes under study.

Although SO_2 has been reduced substantially due to government limits on the sulfur content of fuels in the early 1990s, the level of SO_2 in Hong Kong still ranks in the middle among more than 30 metropolitan cities in the world. The SO_2 level in Hong Kong is higher than those in Berlin, Germany; Boston, Massachusettes, USA; Brisbane, Australia; Kuala Lumpur, Malaysia; London, United Kingdom; and Paris, France.

The levels of NO_2 and O_3 have been increasing along with increasing vehicular traffic volume. Levels of PM_{10}, which is primarily related to the use of diesel engines, in Hong Kong are among the highest in the world: they are only lower than those in the most polluted cities such as Barcelona, Spain; Guangzhou, China; Manila, Republic of the Philippines; Mexico City, Mexico; Philadelphia, Pennsylvania, USA; Santiago, Chile; Shanghai, China; and Taipei, Taiwan.

A major finding of this study is that O_3 had effects on all three mortality outcomes during the cool season, and the effects were greater than those in the warm season; this is unlike several other reports in which the effects were found in the warm season. This is consistent with previous reports on the effects of pollution on hospital admissions due to heart failure in subjects $\geq$ 65 years of age. The effects of the other oxidant pollutants (NO_2 and SO_2) were also significant for all of the mortality outcomes in the cool season but not in the warm season. In Athens, Greece, effects of SO_2 on all causes of non-accidental mortality were also observed in the cool season, but in London, the effects for NO_2 and SO_2 were observed in the warm season. When the data from five western European cities and four central European cities were combined, SO_2 also showed slightly stronger effects during the warm season than during the cool season.

In Hong Kong in the cool season, air pollutant levels were higher (NO_2, 64 vs. 48; PM_{10}, 62 vs. 42; O_3, 35 vs. 32 $\mu g/m^3$) than those in the warm season, except SO_2, which was slightly lower (17 vs. 18). Because pollutants were correlated (r=0.54-0.72 between NO_2, SO_2, and PM_{10} during the cool season), greater effects observed during cool weather may be due to other pollutants that were also at higher levels during the cool season. The cool season in Hong Kong is drier (humidity 75% vs. 81%), less cloudy (63% vs 72%), and less variable, so people are more likely to go outdoors and open the windows, thus being exposed to higher levels of air pollution. In contrast, during the warm season (temperatures of 25°C-30°C and humidity of 73%-91% between 10^{th} to 90^{th} percentiles) people usually use air-conditioning, thus reducing the risks of outdoor ambient air pollution exposure.

Another major finding in this study is the positive exposure-response relationships for NO_2 and SO_2 and all the outcomes during the cool season. There were no thresholds, and the effects showed an inverted "j" shape at higher concentrations. At very high concentrations, the risks of mortality could be reduced possibly because vulnerable subjects may have died before the concentration had reached the maximum levels (4). During the warm season, no consistent positive or negative relationships were observed for all the pollutants. In Hong Kong, there are greater variations in weather conditions in the warm season, when heavy rain, rain storms, and typhoons are common. These factors, in addition to the frequent use of air-conditioning, would prevent the actual exposure-response relationships between air pollution and mortality from being readily observable.

In setting air pollution control policy from a public health viewpoint, it is important to identify the health effects of air pollutants from local data. Because of the lack of data, there are few studies based on daily hospital admissions and mortality in the Asia Pacific region. For hospital admissions, there has been only one study in Australia and two in Hong Kong. For mortality studies, there have been one in Beijing, China based on 1-year daily data, two in Australia, and two in Korea. The present report should contribute to the understanding of the effects of air pollutants in this region and may clarify the differences in effects and mechanisms between Western and Eastern populations.

Local data on health effects of air pollution are required for setting standards and objectives for air pollution controls. When local data are not available, foreign data may be helpful, but they may not be relevant or applicable because of a difference in climate or other conditions.

Source: Environmental Health Perspectives, Vol. 109, No. 4, April, 2001.

SECOND ANNOUNCEMENT AND CALL FOR ABSTRACTS AND POSTERS

INTERNATIONAL CONFERENCE ON ENVIRONMENTAL THREATS TO THE HEALTH OF CHILDREN HAZARDS AND VULNERABILITY

AT THE CHULABHORN RESEARCH INSTITUTE, BANGKOK, THAILAND 3-7 MARCH 2002

Participants are invited to submit an abstract for presentation in one of the following Focus Sessions:

1. Environmental Tobacco Smoke: A Global Epidemic
2. Pesticide Exposures: Short and Long-Term Health Effects
3. Health Impact on Children in Natural and Technological Disasters
4. Scavenging and Hazardous Waste
5. Emerging Food Safety Issues
6. Urban Malaria: Community Management
7. Health Benefits of Water Sector Interventions
8. Environmental Health Issues of Children
9. Hazardous Exposures and Injuries in the Workplace
10. The Home Environment: Injuries and Accidents
11. Multiple Manifestations of Mercury Toxicity
12. Paediatric Cancer and the Environment
13. Persistent Organic Pollutants (POPs): Impact on Future Generations
14. Care for Development

Participants are also invited to submit a poster on any topic relating to Children's Environment Health.

Abstracts and summaries of posters to be sent to:

Task Force for the Protection of CEH
Dr. J. Pronczuk, Office L.218
WORLD HEALTH ORGANIZATION (WHO)
20 Avenue Appia. 1211 Geneva 27 Switzerland

For further information http://www.who.int/peh/ceh/Bangkok/bangkannounc2.htm

Chulabhorn Research Institute

Calendar of Training Program Year 2002

Date	Activities	Country
24-28 June	Introductory Course: Executive Seminar in Environmental Toxicology and Management for Sustainable Development	Myanmar
1-3 July	Introductory Course: Executive Seminar in Environmental Toxicology and Management for Sustainable Development	Cambodia
3-6 July	Introductory Course: Executive Seminar in Environmental Toxicology and Management for Sustainable Development	Lao People's Democratic Republic
23 Sep.-4 Oct.	Training Course on Principles of Environmental Toxicology and Pollution Control *Registration Fee: US$650* *Further information can be obtained from:* *Chulabhorn Research Institute* *Office of Academic Affairs* *Vipavadee-rangsit Highway, Lak Si* *Bangkok 10210* *Tel: (66-2) 574-0622 ext. 1602* *Fax: (66-2) 574-0616, 247-1222* *E-mail: vina@tubtim.cri.or.th*	Thailand

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